Meeting Summary
Environmental Technology Verification Pilot - Wet Weather Flow Technologies
Stakeholder Advisory Group

November 12, 1998
Baltimore, MD

(See Attendance Record for Participants)

Opening Remarks

Tom Stevens (NSF) welcomed all participants to the first Stakeholder Advisory Group (SAG) meeting for the Wet Weather Flow (WWF) Technologies ETV Pilot. Mr. Stevens announced that the morning agenda would also include brief presentations by Mary Stinson (USEPA Pilot Manager) on the national significance of wet weather flows and by Tom Bruursema (NSF General Manager, Environmental and Research Services) on NSF International. Mr. Stevens introduced John Schenk as the new Manager of the WWF Technologies Pilot. Tom Stevens will manage the Source Water Quality Protection Technologies ETV Pilot, also a cooperative agreement between US EPA and NSF International.

Self-introductions were made by all present, including the Stakeholder Advisory Group, other stakeholders and observers, EPA personnel, and NSF Personnel. Of the 23 member Stakeholder Advisory Group, 16 members and 2 designated alternates were present. The total number of attendees was 53 including an additional 22 Stakeholder observers, 9 representatives from EPA and 4 representatives from NSF.

Tom Stevens reviewed some procedural matters and outlined the goals for the meeting as follows:

- Familiarize Stakeholders with the Pilot purpose, structure and function
- Identify and Prioritize WWF Technologies for verification
- Agree on critical elements of a test protocol
- Establish an action plan for protocol development
- Establish the date and city of the next SAG meeting

Overview of the USEPA Environmental Technology Verification Program

Penelope Hansen, Director of EPA's ETV Program, described the background, goals, and principles of the ETV Program administered by the USEPA Office of Research and Development. Ms. Hansen described the basic processes by which the program and its 12 separate pilots function. The criteria of fairness, credibility, transparency and quality were highlighted as key elements of the ETV program. Ms. Hansen indicated that a report will be made to Congress in 2001 in which several questions regarding the need and value of an EPA verification program will be answered. Ms. Hansen shared the program's

vision of having a fully functioning universe of third-party verification organizations covering all classes of environmental technologies by the year 2005. More information regarding the ETV program can be obtained by visiting the ETV homepage at www.epa.gov/etv.

In response to several questions raised by SAG members, Ms. Hansen made the following points:

- Technology verification is not intended to drive regulations
- It may be possible to evaluate technologies in the public domain, if desired, using the protocols developed under the ETV.
- While other ETV pilots have generally focussed on individual vendor technologies rather than engineered systems or processes, the extent to which systems/processes could be verified may need to be considered.
- The ETV Quality Management Plan addresses the potential need for the periodic updating, revision, and/or elimination of test protocols and verification statements.
- It may be possible for verification testing to address factors related to the long term operation of a technology. This may be accomplished by issuing initial verification report with a subsequent update including operational factors.

National Significance of Wet Weather Flows

Mary Stinson gave a presentation on the scope of the WWF problems facing communities in the US today. The presentation included estimates on the costs associated with achieving compliance with national CSO, SSO and Stormwater policy. Buddy Morgan (Montgomery Water Works & Sewer Board) commented that control of non-point source (NPS) pollution should also be considered in addition to POTW/end-of-pipe treatment approaches. While there was agreement that abatement of NPS pollution is critical, NSF noted that the nature of the ETV Program is to focus on technologies. It was noted that some technologies associated with eliminating NPS pollution may best be addressed by the other ETV Pilot managed by NSF called Source Water Quality Protection Technologies.

Overview of the WWF Technologies Pilot

Tom Stevens gave a presentation on the overall structure of the Pilot including the composition and role of the Stakeholder Advisory Group. Mr. Stevens explained that multiple technology panels (ideally comprised of 6-8 people each) will be formed to oversee development and implementation of the test protocols that will eventually serve as the basis for verification testing. Mr. Stevens explained that the individuals responsible for drafting protocols could include technology panel members, NSF personnel, or paid consultants, depending on the availability and suitability of existing test protocols. Mr. Stevens stressed that openness is critical to successful protocol acceptance and that there will be public comment periods, in addition to the review by the technology panels and the SAG.

With respect to testing, Mr. Stevens indicated that NSF does not have a test facility suitable for testing WWF technologies and that identification of appropriate field sites is important. Test Plans would have to developed that are specific to the test site and the test could be conducted by NSF or a subcontractor with NSF oversight. Mr. Stevens explained that vendors will be required to cover costs associated with testing, although a portion of pilot funds are designated to help defray testing costs.

In response to a question form Charles Rowney (CDM, Inc.), Mr. Stevens explained that single protocols could potentially cover a wide range of vendors within a particular class of technology. Richard Field (USEPA) asked if the pilot can test systems that have already been purchased by a municipality and are in place. Mr. Stevens felt this may be possible provided the critical elements of the test protocol and quality assurance issues are addressed. Bill Anderson (AAEE) expressed support for using protocols that already exist today.

In response to a question from Eric Strecker (URS Greiner Woodward Clyde), Tom Stevens explained that the SAG and appropriate Technology Panel will have the opportunity to review Verification Reports on specific technologies prior to their release.

Phillipe Topalian (Kruger, Inc.) asked for an estimate on how long testing will take to complete. Tom Stevens said it will depend on the type of technology and specific protocol. Penelope Hansen said that other ETV Pilots had tests that ranged from 2 days to 1 year. Richard Field emphasized the importance of taking advantage of windows of opportunities that may exist with demonstration projects underway or that are about to start around North America.

Introduction to NSF International

For the benefit of those who may have been unfamiliar with NSF International, Tom Bruursema presented an overview of the organization, including its mission, history, and its role in the marketplace. More information is available at the NSF Homepage (www.nsf.org).

Regulatory Perspectives on WWF

To help provide context for later discussions, the following individuals provided a brief overview of regulatory initiatives taking place on the Federal and state levels with respect CSOs, SSOs, and stormwater:

- *Kevin Weiss (USEPA) described efforts by EPA to develop and implement policy for SSO control including the development of requirements for treated discharges and the reevaluation of in-system treatment.*

- *Tim Dwyer (USEPA) provided an overview of the phased implementation of the 1994 CSO Policy and described efforts on the part of States and municipalities to develop long term control plans for CSO communities (15% in place to date).*

- *Norbert Huang (USEPA) briefly described Agency efforts to meet a 3/99 deadline for the completion of the Phase II Stormwater Rule which will provide flexibility for facilitating watershed management on a local level while calling for Stormwater permits for municipalities and construction sites.*

- *Paul Richard (MA Exec. Office of Environmental Affairs) reviewed Massachusetts' approach to SSO (thou shall not have), CSO (follow the 9 guidelines identified in EPA's Phase I Stormwater plan), and Stormwater (40% of problem; control is by 9 Stormwater Management Standards developed by Regulatory Agency and enforced at local level).*

- *Stephen McLaughlin (Maine DEP) highlighted efforts to develop long term CSO control plans in Maine's 45 CSO communities which will allow for waivers based on meeting water quality Standards. Maine has also developed Stormwater guidelines with quality and quantity standards and a BMP manual that assigns TSS & Phosphorus removal efficiencies for various stormwater BMPs.*

- *Tommy Stevens (NC Div. of Water Quality) explained that N. Carolina has placed emphasis and dollars on improving collection systems where needed to reduce the impact of over 2000 overflows each year. NC implementing 30% Nutrient Reduction Plan for Stormwater.*

In the general discussion, the focus shifted to the costs associated with CSO, SSO and Stormwater treatment and the challenges faced by small-budget municipalities faced with expensive solutions. Several comments emphasized that ETV verification should focus on cost-effective technologies and that a verification report should address the real costs associated with selecting a specific technology to achieve a certain level of performance. While it was recognized that generating meaningful cost information will present a significant challenge, the Stakeholder Advisory Group was unanimous in making the following recommendation:

> *Technology panels should recognize the importance of meaningful cost information and should attempt to address the costs of technologies when developing protocols and verifying WWF technologies.*

Categorization and Prioritization of Technologies

Kevin Smith (NSF) reviewed the general considerations and criteria for establishing priorities among the various categories of WWF technologies. The following were identified as important considerations that the SAG should apply during prioritization:

- The extent to which the technology addresses a significant wet weather concern;
- The value that a verification statement would have to prospective technologies vendors;
- The extent to which verification will satisfy the needs of equipment users (e.g., municipalities);

- The feasibility of conducting and completing testing in a timely manner, including opportunities to "piggy-back" on project currently underway.

It was recommended that vendors in the WWF marketplace be solicited for their level of interest in obtaining verification. The extent to which vendors are interested will, in large part, dictate where protocol development efforts will focus. Participants also suggested polling municipalities to determine where their needs lie. John Schenk indicated that NSF will consider verification of any WWF technology where there is vendor or user interest, particularly if substantial test protocol work has already been done on their behalf.

Starting with a list of technologies developed by EPA and NSF, the SAG compiled a master list of technology categories and relevant subcategories that may be suitable for verification. The SAG went through that list and assigned priorities based on the considerations outlined above. Mary Stinson also presented overheads showing "windows of opportunity" that exist for possible collaborative efforts with tests/demonstration projects underway around North America for Filtration, Screening, Disinfection, Sedimentation/separation, Flow Measurement, and Inlet Devices. Ms. Stinson also identified some existing documents that may serve as precursors to test protocols that may be developed for the Pilot.

Table 1 summarizes the technologies categories and subgroups identified by the SAG, the suggested priority designation (I, II, III, or SWP), and in some cases the appropriate WWF application to focus upon. The priority designation legend describes what follow-up activities are necessary in the coming months for each designation.

Extensive discussions took place regarding the most appropriate categories of technologies on which the Pilot should focus. The following are some important points made during the categorization/ prioritization discussion.

Models

David Bingham (Metcalf & Eddy) indicated that verification of models used in the characterization of WWF and the design of control facilities would be of significant value to those who purchase and use the models. The Group identified three general types of models used in the wet weather area (see Table 1). Charles Rowney commented that while he neither endorsed or rejected the idea of model evaluation, it would be possible in principle to undertake such an evaluation. He noted that although the total function or usefulness of a model could probably not be verified, there were elements of models that could in fact be verified according to a protocol based on scientific fact. He cited such things as a model's ability to conserve mass, it's Y2K compliance, and it's actual solution of functions as stated in model documentation, would be examples of aspects that could be verified with rigor. He commented that as practitioner, he could see some value in the community having some formal assurance that the 'black box' models offered for sale by some vendors do indeed act as represented, an assurance which is otherwise difficult to obtain. He acknowledged an uncertainty as to whether this kind of verification is reasonably within the scope of the ETV process.

Inlet Devices (source control devices)

Several different subcategories were identified under this heading. The expectation is that a single technology panel should consider how Protocols may be used and what specific protocols are needed. There was general agreement that all affected parties could benefit from verification of technologies used in the upstream treatment and control of stormwater. SAG members commented on the efforts of EvTEC (a private ETV pilot run by the Civil Engineering Research Foundation) in this area. To prevent duplication and to maximize resources, it was suggested that cooperation between the two pilots be sought. Some WWF SAG members and observers participated in the development of a test protocol for devices used to treat highway runoff. It was agreed that the WWF pilot should build on that effort.

High-rate treatment technologies

Of the various technologies now being applied in the rapid treatment of CSOs and SSOs, the SAG felt inertial separators and disinfection equipment should receive the early focus. Warren Kurtz (NYCDEP) indicated that New York City will be conducting tests on vortex separators, chemically-enhanced inertial separators, and disinfection equipment for CSO treatment. He favored the concept of piggy-backing the ETV on these tests. Mary Stinson identified other tests that are planned that may present opportunities to move the verification process along.

Stephen Hides (H.I.L. Technologies) cautioned that every CSO case is different and thus results at any one location may have limited relevance at other locales. **He noted that** this may limit vendor interest. It was noted that efforts must be made to ensure test protocols/results are as widely representative as feasible.

It was also noted that the performance of vortex separators have been well characterized and thus more emphasis should perhaps be placed on ballasted systems where there are more questions regarding performance. Several projects (complete, underway, and projected) where ballasted or micro-carrier settling could be tested in a short time frame and with a good chance of success were noted.

Monitoring equipment

There was considerable support for investigating vendor interest in flow measuring, monitoring, and sampling equipment. The SAG felt this is an area that could benefit from verification and can be addressed rather quickly. Mary Stinson indicated that the Quebec Urban Community (QUC) has informed EPA that it has an amenable setup to host an evaluation of flow measuring devices from multiple vendors.

Street Sweepers

Roger Bannerman (WI DNR) suggested that the Pilot consider evaluating the performance of street sweeping equipment. There was a brief discussion regarding the

impact that high-efficiency street sweepers can have reducing NPS pollution. Roger Bannerman indicated that there has been interest on the part of manufacturers in having their equipment evaluated. Richard Field questioned the need for verifying this type of technology under the ETV program but if so, he suggested it be considered a low priority.

Technology Panel Formation

No specific panels were formed at the meeting. It was agreed that Panels should be formed as needed to respond to testing opportunities and/or heightened vendor interest. Stakeholders interested in serving on Technology Panels or who know of experts in specific areas were asked to contact Kevin Smith at NSF.

Miscellaneous issues

Bill Cairns (Trojan Technologies) asked if the ETV will do comparisons of multiple technologies tested simultaneously as part of a treatment train. Penny Hansen responded that per a congressional mandate, comparisons between technologies shall not be a part of any ETV report and that each technology is to be tested individually.

The SAG discussed whether a product purchased by a municipality may be verified under ETV without participation or consent by the technology vendor. It was clarified that ETV is a voluntary program and there must be a vendor agreement in order to have verification by NSF and EPA. This does not preclude parties from using a protocol developed under the ETV program (a public document) to conduct testing on their own (with no NSF/EPA verification statement issued). Extensive related discussions reinforced the point that the principles of scientific validity must be respected. Charles Rowney noted that no data, including an instance of an implementation, can be rejected arbitrarily, and that there would have to be a scientific basis for not including an application of a technology in the verification program once a technology has been proposed and agreed to for formal verification. Penelope Hansen noted that the ETV was not intended to be and R&D program for vendors. Further discussion clarified that this was understood, but that the principles of scientific validity were fundamental to the ETV process.

It was agreed that a Draft meeting summary should be distributed to meeting attendees for a 2-week comment period before a final summary is made publicly available. If possible, items disputed by a meeting attendee will be withheld from the summary until resolved by the SAG.

Next meeting date

The next meeting date was tentatively scheduled for the week of March 22-26, 1999. It is expected that 1½- or 2-day meeting may be necessary. Locations under consideration include Dallas-Ft. Worth, Atlanta/Columbus GA, Las Vegas, and Baltimore. It was also suggested that a location be selected that may allow for a visit to a facility where testing or full-scale operations can be observed. NSF will look into locations and will consider all suggestions.

All attendees were thanked for their active participation in a successful meeting**.**

The meeting was adjourned at 4:30 PM.

Table 1 - WWF Technology Categorization and Priorities (11/98)

Technology Category / Subcategories	**Priority Designation[1]**	**Application**
High-rate inertial separators a) Ballasted / chemical / lamella b) vortex	I	CSO; SSO
Fine Screening	II	
Coarse Screening	III	
High-rate filtration	II	
High-rate Biological Treatment	III	
High-rate Disinfection	I	CSO; SSO
Source Control Devices a) catch basins/inserts c) treatment devices b) inlet controllers d) porous pavement	I	CSO; Stormwater
Monitoring equipment a) flow measuring devices b) samplers c) sensors	I	CSO; SSO; Stormwater
I/I Rehabilitation Technologies	SWP	
Flushing Systems a) basin b) sewer	II	
Erosion control technologies	SWP	
Street sweepers	II	
Models a) Collection system c) Receiving water b) Treatment/process d) Combinations	I	CSO; SSO; Stormwater

[1]Priority Designation legend

Designation	**Priority**	**Actions to be taken**
I	High	Actively solicit vendor; assess user needs; identify existing protocols; identify potential test locations and speak with principals involved; form technology panels
II	Medium	Solicit vendor interest; consider verification activity in 6 to 12

		mos.
III	Low	Field inquiries regarding need for verification in future
SWP		Defer to the Source Water Quality Protection Technologies ETV Pilot

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Presentation to Stakeholder Advisory Group Meeting

November 12, 1998
Mary Stinson, USEPA
National Significance of Wet Weather Flows

Urban Wet Weather Flows

- Combined Sewer Overflows (CSO)
- Sanitary Sewer Overflows (SSO)
- Stormwater
- POTW Bypasses

  Pose Threat to:

  - Water Quality
  - Aquatic Life
  - Human Health
  - Property

Combined Sewer Overflows

- Combined Sewer Systems: ~ 1,100 Municipalities
- Population Served: ~ 43 Million
- CSO discharges: ~ 15,000

Sanitary Sewer Overflows

- 1/3 to 2/3 of 18,500 municipal sanitary sewer systems have SSO/high flow problems
- 149 million people served by 500,000 miles of sewer pipe
- Estimated 40,000 SSO events per year (~ 80 SSOs/1,000 miles/year)

Stormwater

- NPDES Permits now required:
  - Cities of population > 100,000
- NPDES Permits to be required:
  - ~ 3500 smaller municipalities

    - ~ 110,000 construction sites / year
- 1.2 million industrial, commercial, institutional and retail sources of stormwater discharges

Estimated National Cost of Compliance

- Total capital costs: ~ $130 Billion
- Annual costs:
    - ~ $14 Billion
    - ~ $150-200/household
- Does not include costs to correct POTW bypasses

Presentation to Stakeholder Advisory Group Meeting

November 12, 1998

Thomas Stevens, NSF International
Overview of ETV Wet Weather Flow Technologies Pilot
Pilot Structure

Role of Stakeholder Advisory Group

Makeup of Advisory Group

- Balance of viewpoints representing all stakeholder interests
    - Approximately 24 participants

Function of Advisory Group

- Prioritize technologies
- Policy recommendations to NSF as Verification Organization
    - Review and recommend acceptance of protocols
    - Strategic planning

Role of Technology Panels

Makeup of Panels

- Chaired by member of Stakeholder Advisory Group
    - Number of members based on complexity
    - Participants experts in the applicable technology

Function of Panels

- Technical review and development of initial draft protocol
    - Resolution of comments received during open review period
    - Submit final draft of protocol to S.A.G.

Testing Overview

Vendor solicitation upon acceptance of protocol

- Testing location to be determined by protocol requirements
- Field test plan accepted by NSF prior to testing
- Testing completed by NSF or Field Testing Organization (with NSF auditing)
- QA/QC review by EPA and NSF
- Verification statement and report issued upon test completion

Vendor Role in Testing

Vendor contracts with NSF for testing
Vendor may identify site for testing
Vendor, NSF and Field Testing Organization develop test plan
Vendor provides equipment and installation
Vendor provides training for operation of technology during test
Vendor pays for testing (possible partial support from Pilot**)**

Attendance Record

Wet Weather Flow Technologies Pilot - Stakeholder Advisory Group Meeting
November 12, 1998 - Baltimore, Maryland

<u>Advisory Group Members Present</u>

William Anderson - American Academy of Environmental Engineers
Roger Bannerman - Wisconsin Department of Natural Resources
David Bingham - Metcalf & Eddy, Inc.
Mervyn Bowen - Infilco Degremont, Inc.
William Cairns - Trojan Technologies, Inc.
Patricia Cazenas - Federal Highway Administration
Dennis Dembiec - City of Birmingham, MI
Stephen Hides - H.I.L. Technology, Inc.
Warren Kurtz - NYC Dept. Of Environmental Protection
Stephen McLaughlin - Maine Department of Environmental Protection
Buddy Morgan - Montgomery (AL) Wastewater & Sanitary Sewer Board
Paul Richard - Massachusetts Exec. Office of Environmental Affairs
Charles Rowney -Camp, Dresser & McKee, Inc.
Eric Strecker - URS Greiner Woodward-Clyde

Phillippe Topalian - Kruger, Inc.
Kevin Willis - Gorman-Rupp Company

Advisory Group Alternates

Tommy Stevens - NC Dept. Of Environment and Natural Resources (for Preston Howard)
Ken Eyre - Greeley & Hansen (for Christine Andersen, City of Eugene, OR / APWA)

Observers

Sid Sharma, City of Wilmington, DE
Julia Slack, Limno-Tech, Inc.
Amy Ballard,Woolpert, LLP
John Rolak, Killam Associates
Roger Lehman, Roy F. Weston, Inc.
Joe Zukauskas, Concurrent Tech. Corp.
Richard Sawey, CDM, Inc.
Tom Adams, Vortechnics, Inc.
Jim Zaccaguino, URS Greiner Woodward
Eric Lienhard, Greeley & Hansen
Jesse Goldberg, PA DEP
Stephanie Barrett, ICF Kaiser
Gregory Anderson, Woolpert, LLP
Todd Garber, American Signal
Mark Hausner, BaySaver, Inc.
Al Rae, Consultant
Paul Scally, Delaware River Basin Comm.
Aaron Nelson, URS Greiner Woodward
Remy Stachowiak, US Filter
Mark Hoeke, AMSA
Sharon Thomas, WEF

EPA Personnel

Mary Stinson, ORD
Richard Field, ORD
Penelope Hansen, ORD
Daniel Murray, ORD
Ray Frederick, ORD
John Reyna, ORD
Norbert Huang, Office of Water
Kevin Weiss, Office of Water
Tim Dwyer, Office of Water

NSF Personnel

Thomas Stevens
John Schenk
Tom Bruursema
Kevin Smith

Windows of Opportunity **and** *Precursors of Test Protocols for WWF Pilot*

Supplement to:

Meeting Summary
Environmental Technology Verification Pilot - Wet Weather Flow Technologies
Stakeholder Advisory Group

November 12, 1998

Filtration

Technology	Vendor	WWF Type	Client/Location	Start	Duration
Curtain	**Gunderboom**	**Stormwater**	**MDC/MWRA, Boston, MA**	**5/99**	**2 months/stays**
Pressurized	**Zeta/Flow**	**Stormwater/** **Hot-spot**	**WDNR, Madison, WI**	**6/99**	**6 months/stays**
Fuzzy Filter	**Schreiber**	**SSO** **CSO**	**Rockland County, NY** **Columbus, GA**	**online** **online**	**3 months/stays?** **?**

Screening

CDS	**CDS Technol.**	**CSO, SSO, SW,**	**Louisville, KY**	**Online**	**stays**
CDS	**CDS Technol.**	**SSO**	**Rockland County, NY**	**Online**	**3months/stays**
CDS	**CDS Technol.**	**SW**	**Orlando, FL**	**Online**	**stays**
ClO_2 **UV**	**UVD, Inc.** **Aquionics**	**CSO** **CSO**	**NYCDEP, NYC, NY** **NYCDEP, NYC,**	**5/99** **5/99**	**3 months/stays** **3**

			NY		months/stays
UV Peracetic Acid ClO_2	Trojan ? ?	CSO CSO CSO	Columbus, GA Columbus, GA Columbus, GA	online online online	? ? ?

Sedimentation/Separation

Vortex	Storm King Storm King Storm King	CSO CSO CSO	NYCDEP, NYC, NY Scarborough, Ontario, Canada Columbus, GA	Online Online Online	
	Fluidsep Fluidsep	CSO CSO	NYCDEP, NYC, NY Columbus, GA	Online Online	
Ballasted	Actiflo	CSO	Fort Worth, TX, CDM tested	Online	2 months
	Microsep	CSO	Fort Worth, TX, CDM tested	Online	2 months
	Densadeg	CSO	Fort Worth, TX, CDM tested	Online	2 months
	Parkson	CSO	Fort Worth, TX, CDM tested	Online	2 months

Flow Measurement (In-sewer)

Accusonic	CSO	Quebec Urban Community	5/99 Only summer tests in Quebec	5-6 months entire test for all participating flowmeters
ADS Services	CSO	Quebec Urban Community		
AGC	CSO	Quebec Urban Community		
American Sigma	CSO	Quebec Urban Community		
Badger Meter	CSO	Quebec Urban Community		

Ramsey Lake	**CSO**	**Quebec Urban Community**		
ISCO	**CSO**	**Quebec Urban Community**		
Bestobell	**CSO**	**Quebec Urban Community**		
Marsh McBirney	**CSO**	**Quebec Urban Community**		
MGD	**CSO**	**Quebec Urban Community**		
MRS Magmeter	**CSO**	**Quebec Urban Community**		
Rocky Mountain	**CSO**	**Quebec Urban Community**		

Inlets

BaySaver ®	**Stormwater**	**WASHDOT/EvTEC, Seattle**	**Nov.99**	**2 years**
BayFilter™		**(CTC, David Evans&Assoc.)**		
CDS™				
Stormfilter™				
Vortechs™				

PRECURSORS of TEST PROTOCOLS for WWF PILOT

EPA Reports/papers

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1. EPA-600/2-76-145, NTIS: PB-258743
Methodology for the Study of Urban Generated Pollution & Control

Topics:

- Methods for sampling and sample preservation
- Monitoring instrumentation
- Choice of quality parameters
- Analytical procedures
- Methods of evaluating storm generated discharge pollution
- Procedures for evaluating WWF treatment processes.

2. EPA-600/2-75-027, NTIS: PB-250371
Sewer Flow Measurement, SOTA Assessment

Review of WWF characteristics, need for flow measurement, types of flow data required, and time element in flow data. A discussion of desirable flow measurement equipment characteristics. Included is a compendium of over 70 generic types of primary flow measurement devices.

3. EPA-600/2-75-065, NTIS: PB-250987
An Assessment of Automatic Sewer Flow Samplers -1975

Included is a compendium of 82 model classes covering over 200 models of automatic samplers. Presented is a technical assessment of the SOTA in automatic sampler and design guides for development of improved automatic sampler, as well.

4. EPA-600/2-76-006, NTIS: PB-2-76-006
Design and Testing of a Prototype Automatic Sewer Sampling System

The prototype sampler is described from an installation and operation viewpoint, and the results of preliminary field testing are described. Presented are results from side-by-side testing of four different commercially available samplers. Results ranges from an understatement of pollutant loading by about 25% to overstatements of 200% and more.

This report provides the necessary detailed specifications for a good sampling system.

5. EPA-670/2-75-011, NTIS: PB-242001
Physical and Settling Characteristics of Particulates in Storm and Sanitary Wastewaters

Simulation sewage studies were conducted with the use of artificial test material that matched settling characteristics of solids in three types of sewage and urban runoff. One material was as Amberlite anion exchange resin when ground and sieved between 74 and 149 microns. The second material was Arizona Road Dust, between 10 and 20 microns. Both materials can be used in determinations of physical treatment process design, treatability, and in scale-model efficiency trials.

Also, settling velocity is a needed evaluation parameter for sedimentation and vortex treatment.

6. EPA-600/2-77-051, NTIS: PB-270092
Catchbasin Technology Overview and Assessment

Various catchbasin configuration and sizes were evaluated for hydraulic and pollutant removal efficiencies using hydraulic modeling analyses. This report contains an evaluation procedure for inlet devices, which can also be used for other type of devices.

7. EPA-625/2-77012, EPA Technology Transfer Capsule Report
Swirl Device for Regulating and Treating Combined Sewer Overflows

A new type of combined sewer overflow regulator device, called swirl, was developed under EPA research program in the 70th. Presented are results of a full-scale prototype swirl unit that controlled real overflows in the Syracuse, NY. Discussed are all areas of swirl application: grit separator, primary separator, erosion control device, and stormwater runoff control device.

8. EPA-600/8-82/013, NTIS: PB 82 -266172
Design Manual. Swirl and Helical Bend Pollution Control Devices.

Two types of CSO regulators are described: the swirl and the helical bend regulator /separator. Both unit operate without moving parts and require no outside sources of power. Both can remove up to 50 % of the SS and are effective for treating separate stormwater discharges. Both can serve a dual function-treatment and regulation of the flow. The design manual brings together pertinent information concerning the design and operation of the units and consolidates new information from many reports.

9. Field R., Averill D., O'Connor T.P., Steel Paula
Vortex Separation Technology

Water Qual. Res. J. Canada, 1997, Volume 32, No.1, 185-214

Due to the fact that several types of vortex separators have been developed during the last 30 years, this paper discusses design, application, and evaluation of swirl/vortex technologies as part of CSO and stormwater pollution control systems.

10. Richard Field and Thomas P. O'Connor
Swirl Technology: Enhancement of Design, Evaluation and Application

Journal of Environmental Engineering, ASCE, August 1996, Vol. 122, No. 8, 741-748

Reliable determination of swirl/vortex technology performance depends principally upon accurate sampling techniques, suspended solids and other pollutant analyses, and settling-velocity distribution of influent and effluent. Simultaneous flow-rate measurement synchronized to sampling times is also necessary. This paper discusses design, evaluation, and application practice enhancements for the use of swirl/vortex technologies as part of a combined sewer overflow and stormwater pollution control system.

11. EPA-670/2-73-077, NTIS: PB-231836
Combined Sewer Overflow Seminar Papers

Compilation of technical papers and discussions from several seminars conducted jointly by USEPA and the New York State Department of Environmental Conservation.

12. EPA-670/2-74-049, NTIS: PB-235771
Microstraining and Disinfection of Combined Sewer Overflows-phase III

Evaluated was microstrainer with a stainless steel screen having openings of 23 microns. Suspended solids (SS) in CSO were reduced from 50-300 mg/l range to 40-60 mg/l range when operating at an average rate of

38.4 m/hr (16 gpm/sq ft). Addition of polyelectrolite improved the microstrainer's performance: SS was reduced to an everage of 23 mg/l and the flow rates increased to an average of 87.5 m/hr. Further, coliform reductions across the microstrainer were observed. It was found that microstrianed effluent could be more easily disinfected than the raw CSO. Cost of a microstrainer installation, followed by a high-rate chlorine disinfection and polyelectrolite additions was determined in 1973 dollars.

13. EPA-600/2-79-015, NTIS: PB 296626/5
Dual Process High-Rate Filtration of Raw Sanitary Sewage and Combined Sewer Overflows

From 1975-1977, deep-bed , high-rate gravity filtration (HRF) was piloted at the New York City' Newtown Creek WPCP. HRF proved to be cost competitive with conventional sedimentation facilities for dual-process of CSO treatment with only 5 to 7% the area requirements. For strict CSO treatment, HRF is competitive with dissolved air flotation and microstraining processes.

14. EPA-600/2-89/020, NTIS: Pb 89-188379/A
Development and Evaluation of a Rubber "Duck Bill" Tide Gate

A unique 54-inch diameter rubber "duck bill" tide gate (RTG), used to prevent tidal inflow, was installed in a typical NYC tide gate chamber. The operation of the tide gate was observed over two years. This report describes design development and performance evaluation of the RTG. The evaluation showed that RTG can provide low maintenance and reliable performance as a cost-effective alternative to conventional tide gates. (This report may have a lesser value for technology evaluations under the ETV program).

PRECURSORS of TEST PROTOCOLS for WWF PILOT

Other Test Plans/ Reports

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1. URS Consultants Inc. for the New York City Department of Environmental Protection ,Bureau of Heavy Construction , September 1990

Hydrodynamic Separator Test Program

The objective was to test a skid-mounted unit of a commercial Storm King Dynamic Separator (British) to determine design parameters for design/specification of hydrodynamic separator. The test was to establish the BOD_5, TSS, floatables, settleables , and O&G removal efficiency under various flow and load conditions.

2. Camp Dresser & McKee (CDM) and New York City Department of Environmental Protection (NYCDEP) and Electric Power Research Institute, Inc., (EPRI) for a portion of studies. Work Plans or Test Plans and Reports, dated from 1996 to March, 1998.

CSO Disinfection Pilot Study

This study piloted four high-rate disinfection units: ozone (O_3), chlorine dioxide (ClO_2), ultraviolet light irradiation (UV), and high-voltage electron beam irradiation (E-Beam). These technologies were compared to each other and to chlorination/dechlorination, as well.

3. The Environmental Technology Evaluation Center (EvTEC) and David Evans and Associates for Washington State Department of Transportation, Olympia, WA

EvTEC Draft Evaluation Plan for Ultra-Urban Storm Water Technologies

Baysaver® Separation System

Bayfilter™ Insert System

Continuous Deflective Separation™

Stormfilter™

Vortechs™ Stormwater Treatment System

Dated October, 1998.

The objective of this plan is to perform well-defined field and laboratory testing that will provide baseline environmental data about the effectiveness and removal efficiency of each individual technology held to the same testing protocol.
